

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : OLYMPUS OPTICAL CO LTD

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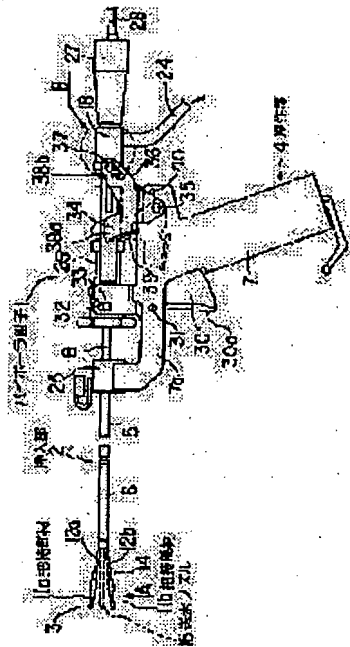
(72)Inventor : KIKUCHI YASUHIKO
HARANO KENJI
IIIDA KOJI
SEKINO NAOKI

(54) TREATMENT DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a treatment device capable of grasping an endotexture to coagulate it to securely achieve hemostasis or the like, and securely capable of feeding water to a treated part to wash blood of hemorrhage or the like.

SOLUTION: In a treatment device having an insertion portion 2, an operation part 4 on the operator's side of the insertion portion 2, and a pair of holding members 11a and 11b at a distal end of the insertion portion 2 to grasp an organization by operation of the operation part 4, a tube cavity to be communicated with a feed water source is provided in the insertion portion 2, and a feed water nozzle 16 opened between the holding members 11a, 11b is provided on the distal end of the tube cavity.



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CLAIMS

[Claim(s)]

[Claim 1] The treatment implement characterized by to prepare the returning-water nozzle which carries out opening between the grasping members of said pair in the point of said lumen while preparing the lumen which is open for free passage in the source of returning water in said insertion section in a treatment implement with the grasping member which can energize the pair for having a control unit in the hand side of the insertion section and the insertion section, and grasping an organization by actuation of said control unit to the point of said insertion section.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is inserted into a living body's coelome, and relates to the treatment implement which can grasp, exfoliate, solidify and cut an organization open.

[0002]

[Description of the Prior Art] Generally, it inserts into a coelome, and has the grasping member of the pair which grasps a body tissue as a treatment implement which grasps, exfoliates, solidifies and cuts a body tissue open, and the bipolar forceps which arranged the electrode for high frequency energization in each grasping member are known. And the high frequency current is energized to inter-electrode [of each grasping member], and it makes it solidify the body tissue between grasping members in the condition of having made the body tissue for treatment grasping between the grasping members of a pair at the time of use of these bipolar forceps.

[0003] This kind of bipolar forceps are usually used for the case of varieties, such as hemostasis of the blood vessel contained in a body tissue, the lesion section of the surface of a body tissue, cautery of a bleeding point, and lock out of the oviduct aiming at contraception. And the body tissue which bipolar forceps were used for the purpose of the hemostasis of a blood vessel and lock out of an oviduct, and can solidify now the body tissue for [of a patient] treatment, and was solidified can be cut open now.

[0004] As the former and this kind of a bottom RF treatment implement of an endoscope, it is USP5071419 and DE19606194, for example. It is known for A1, JP,5-82401,U, etc. A water pipe is prepared in the insertion section, the returning-water nozzle which counters the point of this water pipe at said hook-like electrode is prepared, and the machine for electrosurgeries shown in USP5071419 can be returned to the treatment section while it prepares a hook-like electrode in the point of the insertion section inserted into a coelome.

[0005] Moreover, DE19606194 While the grasping member of the pair which can open and close the medical equipment for an operation of A1 to the point of the insertion section inserted into a coelome is prepared, a water pipe is prepared in said insertion section, and the returning-water nozzle which carries out opening to the side of the grasping member of a pair is prepared in the point of a water pipe.

[0006] Therefore, also in which RF treatment machine, a body tissue can be solidified by the RF and the blood which returned water to the treatment section and bled can be flushed now.

[0007]

[Problem(s) to be Solved by the Invention] However, USP5071419 mentioned above presses a hook-like electrode against a body tissue, solidifies it by the RF, and since there is no holding function, it cannot carry out hemostasis certainly, while not grasping a body tissue or not equipping it with the function to exfoliate. Moreover, DE19606194 Although A1 was equipped with the grasping member of the pair which can be opened and closed to the point of the insertion section, and an organization is grasped or it has the function to exfoliate, opening of the returning-water nozzle is carried out to the location which shifted in the side of a grasping member. Therefore, after returning water, a grasping member is moved, and the time and effort which readjusts a location is needed. Moreover, although a returning-water duct is established in

the insertion section, JP,5-82401,U can be returned from the source of returning water and it can spout from the tip side of the insertion section, the observation port of the optical viewing tube used with a treatment implement is washed, a visual field is maintained, and the purposes differ.

[0008] The place which this invention was made paying attention to said situation, and is made into that purpose can flush the bleeding from an organization, in order to check a bleeding point, and it is by grasping and solidifying immediately the bleeding point checked further to offer the treatment implement in which quick hemostasis is possible.

[0009]

[Means for Solving the Problem] In a treatment implement with the grasping member which can energize the pair for having a control unit in the hand side of the insertion section and the insertion section, and grasping an organization by actuation of said control unit to the point of said insertion section in order that this invention may attain said purpose While preparing the lumen which is open for free passage in the source of returning water in said insertion section, it is characterized by preparing the returning-water nozzle which carries out opening between the grasping members of said pair in the point of said lumen. And grasping coagulation is carried out quickly and the hemostasis of the bleeding point which flushed blood and was checked to the bleeding from an organization by returning water from a returning-water nozzle can be carried out.

[0010]

[Embodiment of the Invention] Hereafter, the gestalt of each implementation of this invention is explained based on a drawing. Drawing 1 - drawing 4 show the 1st operation gestalt, and drawing 1 and drawing 2 are the whole RF treatment implement block diagrams as an endoscopic operation machine. As shown in drawing 1 and drawing 2, it is arranged at the long and slender insertion section 2 inserted in the bipolar forceps 1 as a high frequency treatment implement into a patient's coelome, and the point of this insertion section 2, and the treatment section 3 in which the energization for grasping and exfoliating and solidifying a body tissue within a coelome is possible, and the control unit 4 connected with the end face section of the insertion section 2 are formed.

[0011] The insertion section 2 consists of an outside sheath 5 and an inner sheath 6 inserted in the interior of the outside [this] sheath 5 free [the attitude to shaft orientations], the end face section of the outside sheath 5 is fixed to extension section 7a of the grip 7 which constitutes a control unit 4, and the end face section of the inner sheath 6 is being fixed to the inner sheath driving member 8 prepared in the control unit 4.

[0012] The grasping members 11a and 11b of the pair as the grasping section which constitutes an electrode, and the elastic members 12a and 12b energized in the direction which makes these grasping members 11a and 11b extend are formed in the treatment section 3. Elastic members 12a and 12b are formed with spring steel etc., and the front face of elastic members 12a and 12b is covered with the insulating material 14. Furthermore, when it closes, the serrate section which gears mutually is formed, and the grasping members 11a and 11b are formed so that a body tissue can be grasped certainly.

[0013] Moreover, the water pipe 15 as a lumen is inserted in the interior of the inner sheath 6 free [the attitude to shaft orientations]. This water pipe 15 consisted of a metal capillary, and extended the end face section to the interior of a control unit 4, and the point has extended it to the treatment section 3. Furthermore, the returning-water nozzle 16 which carries out opening is formed between grasping member 11a of said pair, and 11b at the point of a water pipe 15.

[0014] That is, the returning-water nozzle 16 is the configuration where tip opening of a water pipe 15 was extracted to the taper as shown in drawing 3, and the slit 17 is formed in the grasping members 11a and 11b so that the location of the returning-water nozzle 16 can be checked.

[0015] Furthermore, as shown in drawing 4, the returning-water pipe-connection member 18 which connects the end face section of a water pipe 15 is formed in the control unit 4. The aqueduct 19 which consists of dugout 19b which carries out opening is established in the lengthwise direction at the right angle at the returning-water pipe-connection member 18 from

the edge of cave hole 19a which carries out opening to the shaft orientations of a water pipe 15, i.e., a longitudinal direction, and this cave hole 19a. The elastic members 20, such as rubber, are being fixed to cave hole 19a with the stop ring 21, and the puncture of the attitude of acute-angle cut section 15a formed in the end face section of a water pipe 15 to shaft orientations is made free to this elastic member 20.

[0016] Moreover, thread-part 23a of the end face section of the tube connection member 23 is being thrust and fixed to the thread part 22 of said dugout 19a, and the end face section of the returning-water tube 24 is connected to the point of the tube connection member 23 which projects from said returning-water pipe-connection member 18. And liquid sending supplied through the returning-water tube 24 is led to a water pipe 15 through an aqueduct 19, and is spouted from the returning-water nozzle 16.

[0017] Moreover, as shown in drawing 1 and drawing 2, the connection ring 25 by which connection immobilization is carried out is formed in the end face section of the outside sheath 5 at extension section 7a of a grip 7. Furthermore, behind extension section 7a, the back end section of the treatment section 3, and the electrical and electric equipment and the treatment section unit connection 26 for connecting mechanically are arranged.

[0018] It connects with the cable splicing section 27 which the connecting means (not shown) linked to the grasping members 11a and 11b of the pair which constitutes the treatment section 3 was prepared in the treatment section unit connection 26, and was prepared in the back end section of a control unit 4 through this connecting means electrically. This cable splicing section 27 is connected to a RF cautery power unit (not shown) through an interconnection cable 28.

[0019] Moreover, the trigger 30 as a forceps actuation means is formed in the grip 7. This trigger 30 is connected with the upper limit section of a grip 7 free [rotation] centering on the rotation pin 31. Furthermore, the long hole 32 is formed above the rotation supporting point at this trigger 30. The engagement pin 33 by which this long hole 32 protruded on the side face of the inner sheath driving member 8 is inserted.

[0020] Moreover, the lower limit section of a trigger 30 handles inside a grip 7, and the energization member (not shown) which energizes section 30a in the direction (it sets to drawing 1 and is the direction of a clockwise rotation centering on the rotation pin 31) which separates from a grip 7 is arranged. And the trigger 30 is held in the orientation (release location) which is always most distant from a grip 7 with the spring force of an energization member.

[0021] Furthermore, the returning-water control lever 34 as a returning-water actuation means is formed in the side face in the back end upper part of a grip 7. This returning-water control lever 34 is connected free [rotation] centering on the rotation pin 35 to the grip 7.

Furthermore, more nearly up than the rotation core of the returning-water control lever 34 a long hole 36 is formed, and the engagement pin 37 which protruded from the back end side face of a water pipe 15 is inserted in this long hole 36.

[0022] The arm sections 38a and 38b before and after having arranged in the shape of abbreviation for V characters are formed in the returning-water control lever 34. And the fingerplate section 39 is making the duty with which arm 38b of another side regulates the rotation range of the returning-water control lever 34 in contact with a stopper pin 40 one arm section 38a. Furthermore, the rotation pin 35 is equipped with the energization member (not shown) which energizes the returning-water control lever 34 in the direction of a clockwise rotation.

[0023] Here, the inner sheath 6 moves to the shaft-orientations front of the outside sheath 5 through the inner sheath driving member 8 by a trigger's 30 handling, and resisting the spring force of an energization member, drawing section 30a in a grip 7 side, and operating it. It will be in the condition that elastic members 12a and 12b were relatively drawn in the inner sheath 6 with advance of the inner sheath 6, and the grasping members 11a and 11b will close. Moreover, if a trigger 30 is released, return and elastic members 12a and 12b will project from the inner sheath 6 relatively in an orientation according to the spring force of the energization member in a grip 7, and the elastic stability of elastic members 12a and 12b will open the grasping members 11a and 11b.

[0024] Moreover, if a finger is hung on the fingerplate section 39 of the returning-water control

lever 34, the energization force of an energization member is resisted and the returning-water control lever 34 is rotated in the direction of a counterclockwise rotation, a water pipe 15 carries out an advance drive through the engagement pin 37 inserted in the long hole 36, and the returning-water nozzle 16 of a water pipe 15 projects among the grasping members 11a and 11b. If the returning-water control lever 34 is released, according to the spring force of an energization member, return and a water pipe 15 will retreat in an orientation, and will be drawn in the inner sheath 6, and if arm section 38b contacts a stopper pin 40, it will stop.

[0025] Next, an operation of the 1st operation gestalt is explained. An interconnection cable 28 is connected to the cable splicing section 27 of the bipolar forceps 1, and the bipolar forceps 1 and a RF cautery power unit are connected electrically. In an initial state, the trigger 30 of a control unit 4 handles, section 30a is held in the orientation most distant from the grip 7, and the treatment section unit connection 26 is held in the last end position of the successive range of the shaft orientations of the insertion section 2. It is in the condition that the elastic members 12a and 12b of the pair of the treatment section 3 projected from the inner sheath 6, and the grasping members 11a and 11b opened as shown in drawing 1, in this condition.

[0026] Then, the inner sheath 6 moves to the shaft-orientations front of the outside sheath 5 through the inner sheath driving member 8 by a trigger's 30 handling, and resisting the spring force of an energization member, drawing section 30a in a grip 7 side, and operating it. It will be in the condition that elastic members 12a and 12b were relatively drawn in the inner sheath 6 with advance of the inner sheath 6, and as shown in drawing 2, the grasping members 11a and 11b close.

[0027] In this condition, the insertion section 2 of the bipolar forceps 1 is inserted by a patient's inside of the body, and the treatment section 3 at the tip of this insertion section 2 guides to the near location of the body tissue for [in the living body] treatment. If a trigger 30 is released, return and elastic members 12a and 12b will project from the inner sheath 6 relatively in an orientation according to the spring force of the energization member in a grip 7, and the elastic stability of elastic members 12a and 12b will open the grasping members 11a and 11b.

[0028] Then, after inserting a body tissue among the extended grasping members 11a and 11b (mediation), the inner sheath 6 moves to the shaft-orientations front of the outside sheath 5 through the inner sheath driving member 8 by a trigger's 30 handling, and resisting the spring force of an energization member, drawing section 30a in a grip 7 side, and operating it. It will be in the condition that elastic members 12a and 12b were relatively drawn in the inner sheath 6 with advance of the inner sheath 6, the grasping members 11a and 11b close, and a body tissue is grasped.

[0029] At this time, when it closes to the grasping members 11a and 11b, it is formed in the serrate section which gears mutually, and a body tissue can be grasped certainly. In this condition, the high frequency current flows from a high frequency cautery power unit to the code connection 27 through an interconnection cable 28, a coagulation current flows among the grasping members 11a and 11b, and coagulation of a body tissue is performed. After coagulation is completed, if a trigger 30 is released, according to the spring force of the energization member in a grip 7, the inner sheath 6 will open the grasping members 11a and 11b according to the elastic stability of elastic members 12a and 12b to an initial valve position to the outside sheath 5 by return and elastic members 12a and 12b projecting from the inner sheath 6 relatively, and the grasping members 11a and 11b will be wide opened from a body tissue.

[0030] Here, if a finger is hung on the fingerplate section 39 of the returning-water control lever 34, the energization force of an energization member is resisted and the returning-water control lever 34 is rotated in the direction of a counterclockwise rotation, a water pipe 15 moves forward through the engagement pin 37 inserted in the long hole 36, and as the broken line of drawing 1 shows, the returning-water nozzle 16 projects among the grasping members 11a and 11b. At this time, the amount of protrusions of the returning-water nozzle 16 can be checked from the slit 17 prepared in the grasping members 11a and 11b. If the returning-water cock (not shown) prepared in the source of returning water is operated and a returning-water cock is opened in this condition, the liquid will be sent by the aqueduct 19 through the returning-water tube 24, and it will blow off from the returning-water nozzle 16 through a water pipe 15 further.

Since it is located among the grasping members 11a and 11b which opened the returning-water nozzle 16 at this time, water can be certainly returned to the treatment section of a body tissue, and the blood which bled can be flushed.

[0031] If the returning-water control lever 34 is released after returning water is completed, return and a water pipe 15 will be relatively drawn in an orientation by the inner sheath 6 according to the spring force of an energization member, the returning-water nozzle 16 retreats, and if arm section 38b contacts a stopper pin 40, it will stop.

[0032] Moreover, in exfoliating a body tissue, where the grasping members 11a and 11b are closed by the trigger 30 Where the point of the grasping members 11a and 11b is pressed against the exfoliation part of a body tissue If a trigger 30 is released, in order that the inner sheath 6 may open return and the grasping members 11a and 11b according to the elastic stability of elastic members 12a and 12b to an initial valve position to the outside sheath 5 by the spring force of the energization member in a grip 7, A body tissue can be exfoliated by repeating closing motion of these grasping members 11a and 11b.

[0033] Since according to this operation gestalt grasping of a body tissue, exfoliation, and coagulation can carry out with one bipolar forceps 1, exchange of the bipolar forceps 1 can be lessened at the time of an operation, troublesomeness can be mitigated, and compaction of operation time amount can be aimed at, and the returning-water nozzle 16 projects between grasping member 11a of a pair, and 11b and water can be returned to the treatment section, water can be certainly returned to the purpose part.

[0034] Drawing 5 shows the 2nd operation gestalt, and the same component as the 1st operation gestalt attaches the same number, and omits explanation. Dugout 19b and the elastic member 41 tubed in same axle are inserted in the unification section of cave hole 19a and dugout 19b by which this operation gestalt was prepared in the returning-water pipe-connection member 18, and the hard spacer 42 is formed in the wall which counters cave hole 19a of this elastic member 41. Furthermore, acute-angle cut section 15a of a water pipe 15 carries out the puncture of the side attachment wall of an elastic member 41, and is contacted by the spacer 42, and the water pipe 15 is open for free passage to the aqueduct 19. Therefore, like the 1st operation gestalt, if the liquid is sent from the returning-water tube 24, it will be led to a water pipe 15 through an aqueduct 19. In addition, by forming a spacer 42, acute-angle cut section 15a penetrates the side attachment wall of another side of an elastic member 41, and is not closed.

[0035] Drawing 6 shows the 3rd operation gestalt, and the same component as the 1st operation gestalt attaches the same number, and omits explanation. The hollow rod 43 equipped with the grasping members 11a and 11b of a pair is formed in the interior of the inner sheath 6 which constitutes the insertion section 2, and the measurement unit 47 equipped with the temperature measurement sensor or the PH sensor 46 at the knife unit 45 equipped with the incision knife 44 at the tip, the water pipe 15 equipped with the returning-water nozzle 16 at the tip, and the tip can carry out attachment-and-detachment exchange of this operation gestalt alternatively at this hollow rod 43. Therefore, exchange of the bipolar forceps 1 can be lessened at the time of an operation, troublesomeness can be mitigated, and compaction of operation time amount can be aimed at.

[0036] Drawing 7 shows the 4th operation gestalt, and the same component as the 1st operation gestalt attaches the same number, and omits explanation. As for this operation gestalt, the returning-water on-off bulb 48 is formed in extension section 7a of a grip 7 by two or more bolt 48a removable. 1st communication trunk 49a, the 2nd communication trunk 49b, and a cock 50 are formed in this returning-water on-off bulb 48.

[0037] The returning-water tube 24 which is open for free passage in the source of returning water is connected to the 1st communication trunk 49a, the end section of the returning-water free passage tube 51 is connected to the 2nd communication trunk 49b, and this other end is connected to the tube connection member 23 of the returning-water pipe-connection member 18.

[0038] Therefore, if the cock 50 of the returning-water on-off bulb 48 is rotated to an ON side, it will become ON, the liquid will be sent by the returning-water on-off bulb 48 through the returning-water tube 24 from the source of returning water, and the returning-water on-off bulb

48 will be further sent by the returning-water pipe-connection member 18 through the returning-water free passage tube 51.

[0039] In this operation gestalt, it is also possible to post-install, since the returning-water on-off bulb 48 is removable to a control unit 4, and since the returning-water on-off bulb 48 is formed in the control unit 4, improvement in operability can be aimed at.

[0040] According to the gestalt of operation mentioned above, the following configurations are obtained.

(Additional remark 1) The treatment implement characterized by to prepare the returning-water nozzle which carries out opening between the grasping members of said pair in the point of said lumen while preparing the lumen which is open for free passage in the source of returning water in said insertion section in a treatment implement with the grasping member which can energize the pair for having a control unit in the hand side of the insertion section and the insertion section, and grasping an organization by actuation of said control unit to the point of said insertion section.

[0041] (Additional remark 2) Said returning-water nozzle is the treatment implement of the additional remark 1 publication characterized by being arranged so that between the grasping sides of the grasping member of a pair can be moved to shaft orientations.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

- [Drawing 1] The side elevation of the bipolar forceps in the condition of having opened the grasping member which shows the 1st operation gestalt of this invention.
- [Drawing 2] The side elevation of the bipolar forceps in the condition of having closed the grasping member which shows this operation gestalt.
- [Drawing 3] Drawing which showed this operation gestalt and was seen from [of drawing 1] arrow-head A.
- [Drawing 4] The vertical section side elevation which showed this operation gestalt and expanded the B section of drawing 1 .
- [Drawing 5] The 2nd operation gestalt of this invention is shown and it is the vertical section side elevation of the same part as drawing 4 .
- [Drawing 6] The whole bipolar forceps block diagram showing the 3rd operation gestalt of this invention.
- [Drawing 7] The whole bipolar forceps block diagram showing the 4th operation gestalt of this invention.
- [Drawing 8] The whole bipolar forceps block diagram showing the 5th operation gestalt of this invention.
- [Drawing 9] It is the sectional view where this operation gestalt is shown and the sectional view where (a) meets the C-C line of drawing 8 , and (b) meet D-D line of drawing 8 .
- [Drawing 10] It is the sectional view where the 6th operation gestalt of this invention is shown, (a) meets the block diagram of the whole bipolar forceps, and (b) meets an E-E line.
- [Drawing 11] The 7th operation gestalt of this invention is shown and, for the top view of bipolar forceps, and (b), a side elevation and (c) are [(a)] a side elevation at the time of returning water.
- [Drawing 12] The vertical section top view which showed this operation gestalt and expanded the F section of drawing 11 .
- [Drawing 13] The 8th operation gestalt of this invention is shown, for (a), it is the side elevation of bipolar forceps and (b) is the side elevation of the bipolar forceps at the time of returning-water actuation.
- [Drawing 14] The sectional view which shows this operation gestalt and meets the G-G line of drawing 13 .
- [Drawing 15] The 9th operation gestalt of this invention is shown, for (a), it is the side elevation of bipolar forceps and (b) is the side elevation of the bipolar forceps at the time of returning-water actuation.
- [Drawing 16] (a) is a vertical section top view in the condition that H part of drawing 15 was expanded and shown and, as for the vertical section top view in the condition that the water pipe retreated, and (b), the water pipe moved forward.
- [Drawing 17] For (a), in the sectional view which meets the J-J line of drawing 15 (a), (b) is a vertical section side elevation in the condition of having blockaded the returning-water tube, and a vertical section side elevation in the condition of having opened the returning-water tube wide.

[Drawing 18] The 1st example of an indication is shown and it is the side elevation of a bipolar cutter.

[Drawing 19] The side elevation at the time of incision of this example of an indication.

[Drawing 20] The 2nd example of an indication is shown and it is the whole electrocauterization equipment block diagram with a returning-water function.

[Drawing 21] The block diagram of this example of an indication.

[Drawing 22] The flow chart Fig. of this example of an indication.

[Drawing 23] The block diagram showing the 3rd example of an indication.

[Drawing 24] The vertical section side elevation of a jaw showing the 4th example of an indication.

[Drawing 25] The perspective view of a jaw showing the 5th example of an indication.

[Drawing 26] It is the sectional view where the 6th example of an indication is shown, (a) meets the perspective view of a jaw and (b) meets a K-K line.

[Description of Notations]

1 — Pie Poral forceps

2 — Insertion section

4 — Control unit

11a, 11b — Grasping member

16 — Returning-water nozzle

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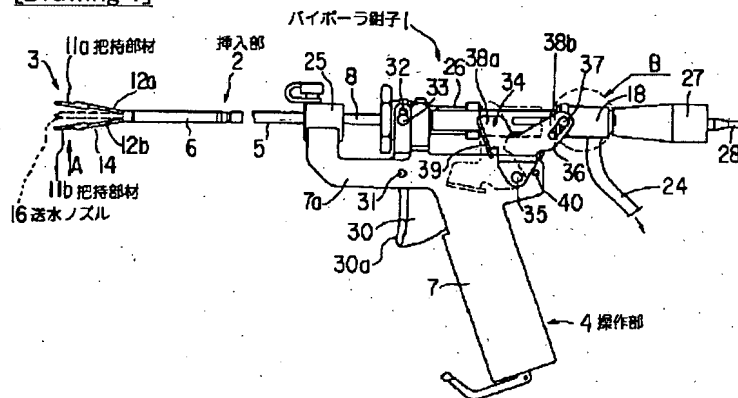
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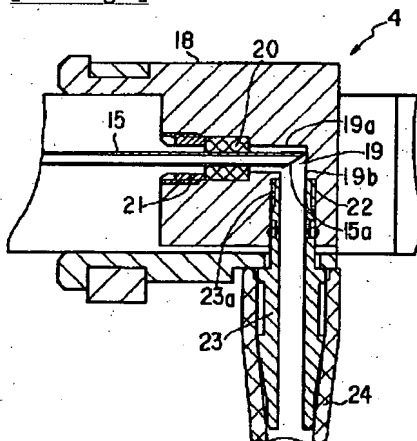
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DRAWINGS

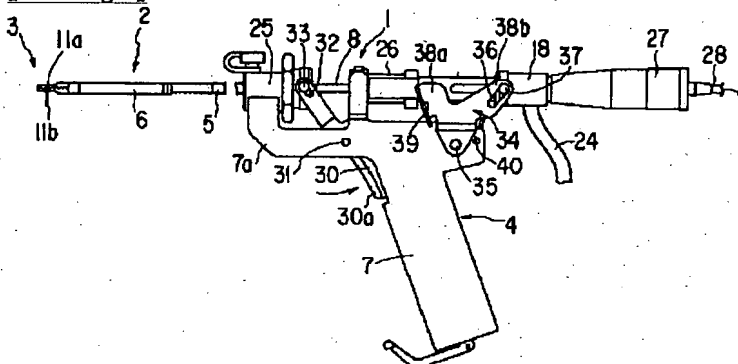
[Drawing 1]



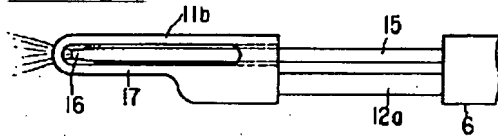
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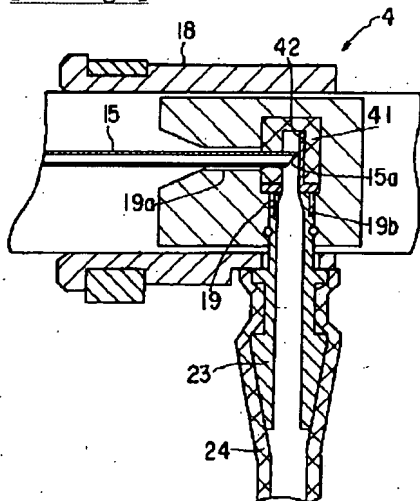
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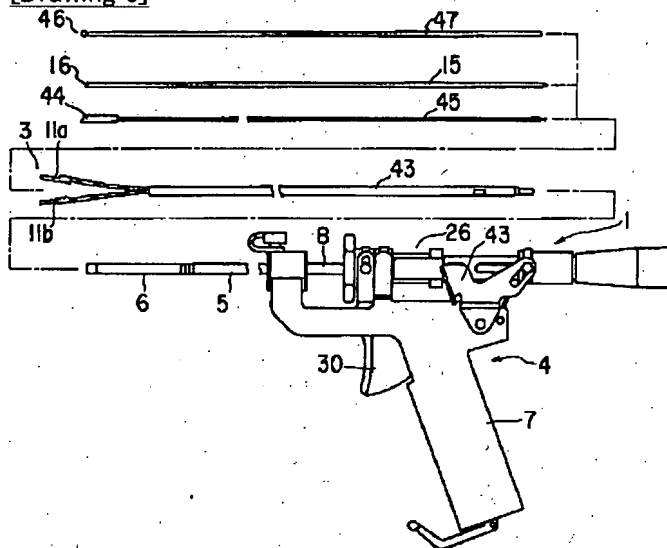
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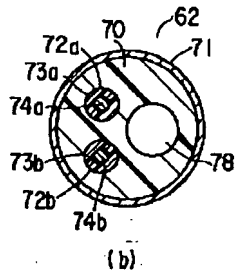
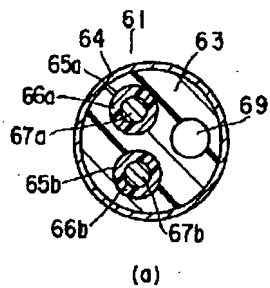
[Drawing 5]



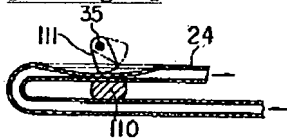
[Drawing 6]



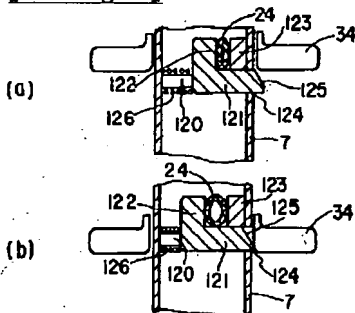
[Drawing 9]



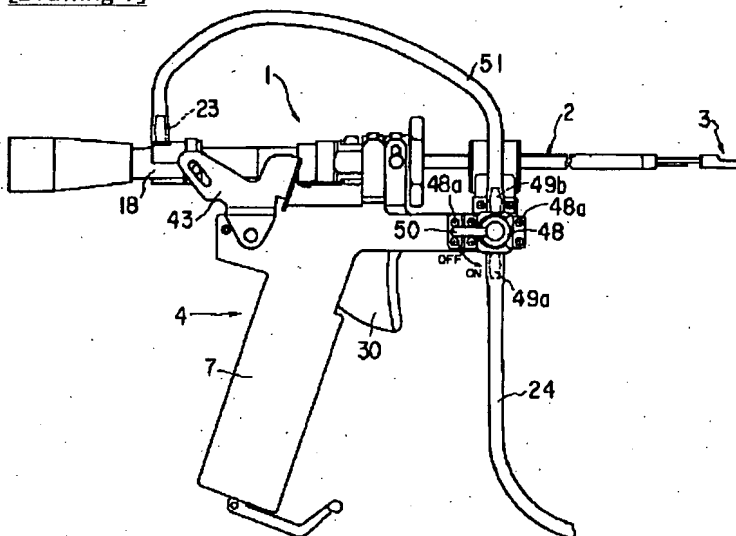
[Drawing 14]



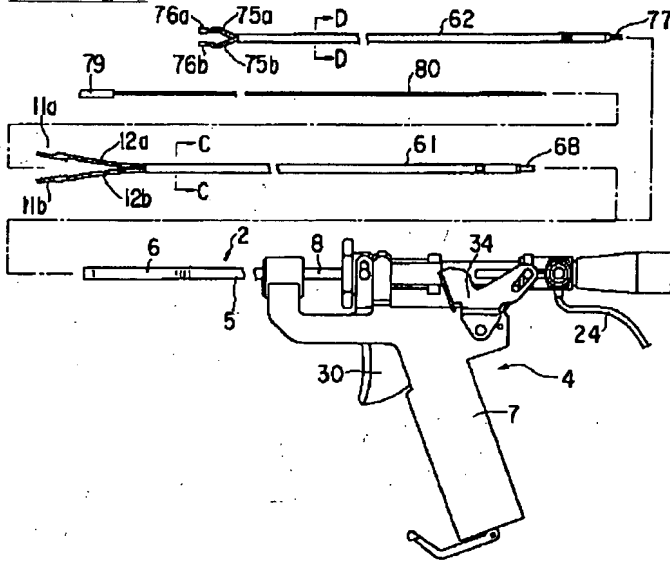
[Drawing 17]



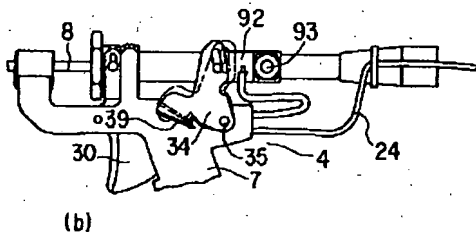
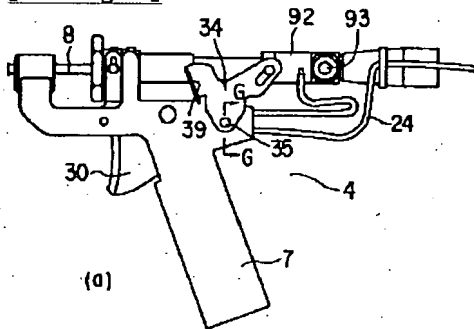
[Drawing 7]



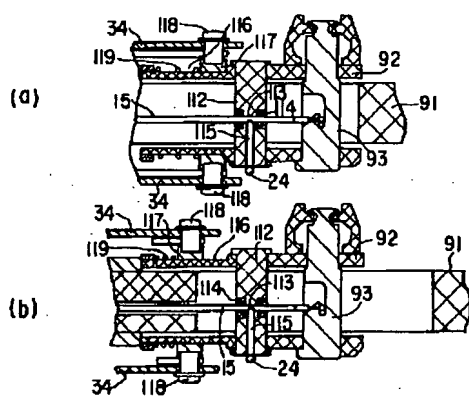
[Drawing 8]



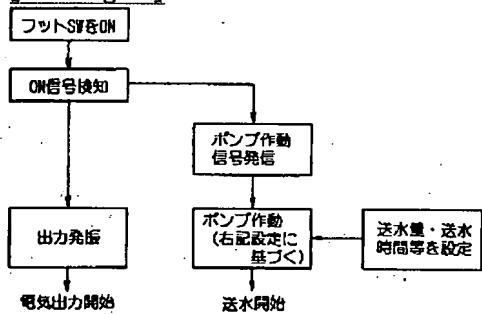
[Drawing 13]



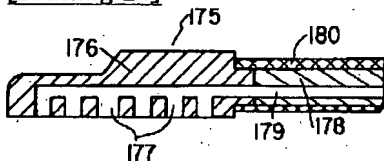
[Drawing 16]



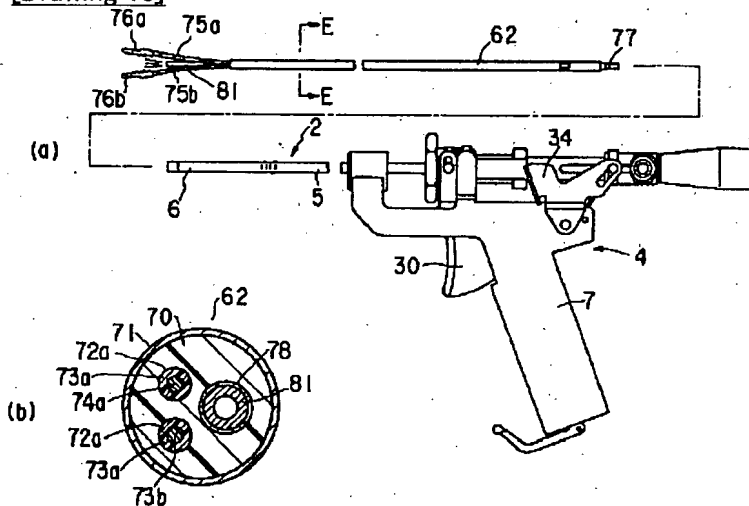
[Drawing 22]



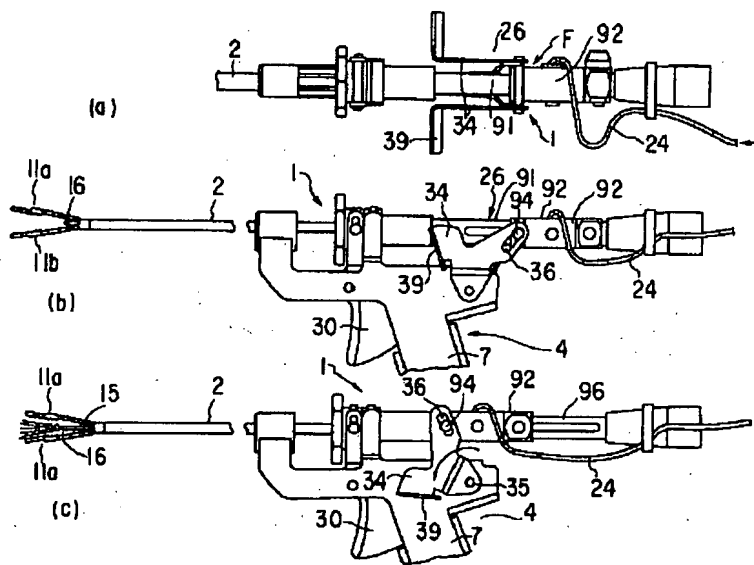
[Drawing 24]



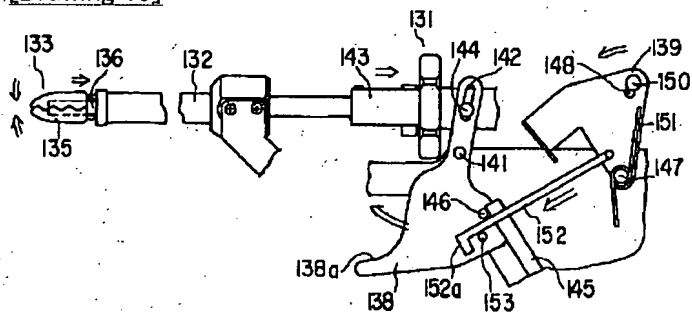
[Drawing 10]



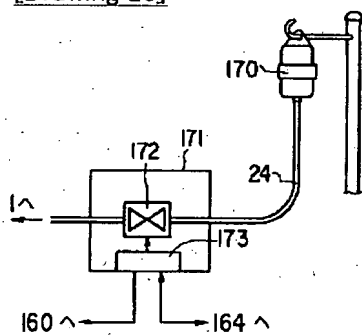
[Drawing 11]



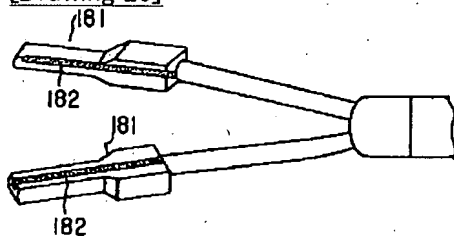
[Drawing 19]



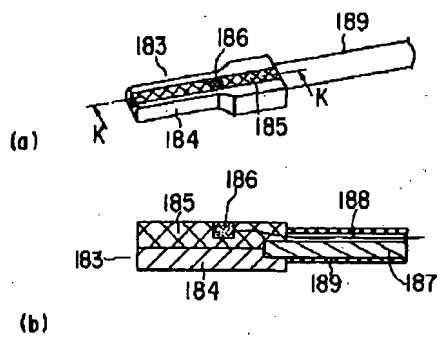
[Drawing 23]



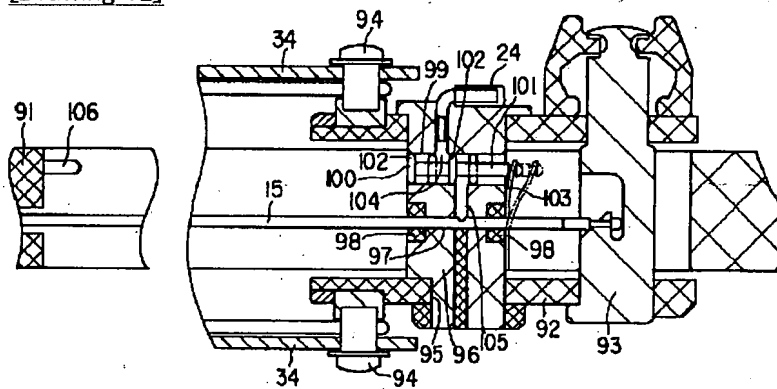
[Drawing 25]



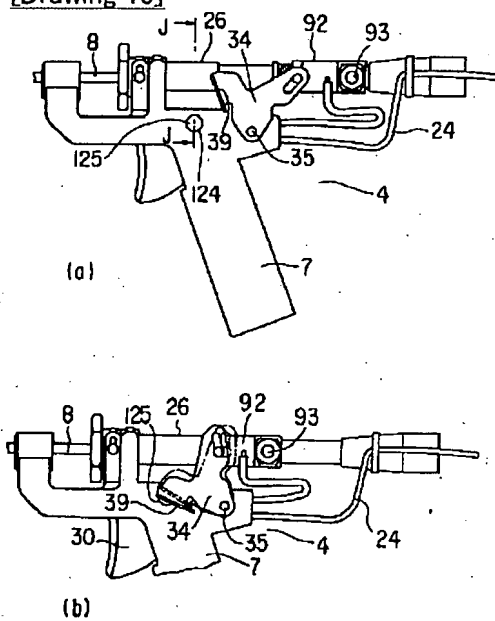
[Drawing 26]



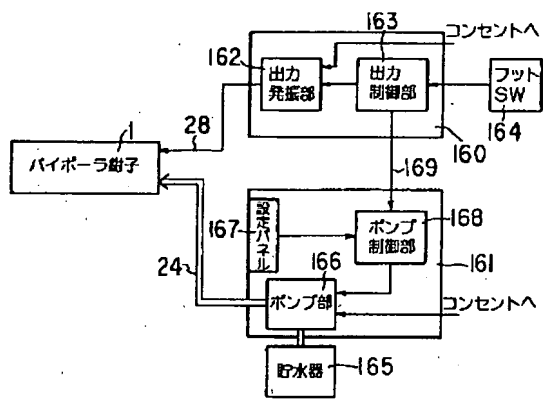
[Drawing 12]



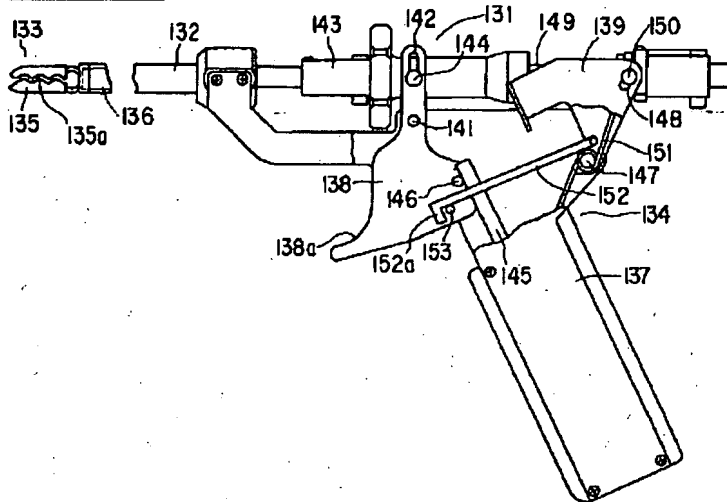
[Drawing 15]



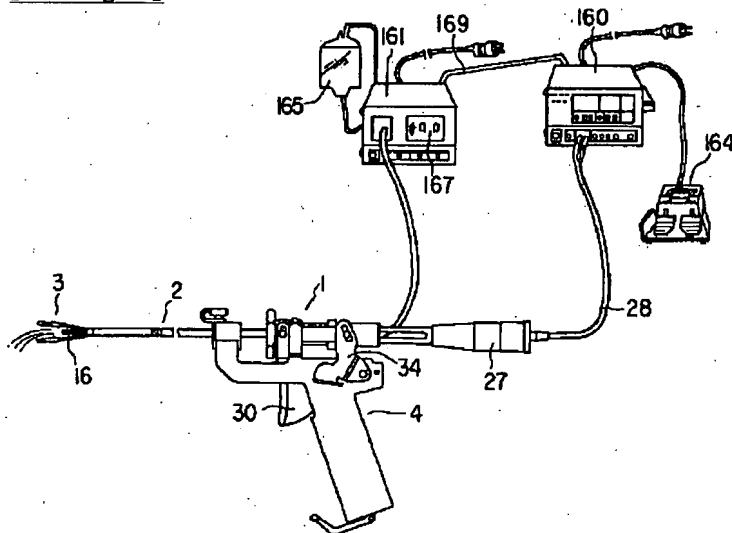
[Drawing 21]



[Drawing 18]



[Drawing 20]



[Translation done.]